REMARKS/ARGUMENTS

Claims 1-20 remain pending.

The claims are rejected as obvious in view of DE 101 52 525 and WO 99/11615. As you are likely already aware, the DE '525 patent application is discussed at page 2 of the present application and describes removing trialkylammonium formate from methylolalkanes by decomposition at elevated temperature in the presence of a hydrogen-containing gas over a catalyst selected from among metals from groups 8 to 12 of the Periodic Table.

The claims are to process to remove trialklyammonium formate from methylolalkanes by decomposing the trialkylammonium formates at elevated temperature with hydrogen in the presence of a catalyst comprising ruthenium supported on titanium dioxide.

While DE '525 exemplifies metals other than ruthenium/titanium catalyst, e.g., copper, nickel and cobalt, the Office's position is that the mere possibility for suggestion in DE '525 renders the claims obvious. WO '615 is cited primarily for shaped catalysts and does not speak to the selection of catalyst with Ru/TiO_2.

As discussed in the application, the selection of the Ru/TiO_2 catalysts results in a formate conversion of 99%, which is significantly higher compared to other catalysts known from prior art, which yield a formate conversion between 11 and 68% only (see table on page 9 of the application, reproduced below).

No.	Catalyst	Shaped bodies	Amount of catalyst [g]	DMB[3] % by area[1]	Formate % by weight[2]	Formate conversion [%]
Starting material				1.93	0.57	-
1	Cu/TiO_2 (DE 198 09 418)	3x3 mm pellets	18.6	< 0.05	0.39	32
2	$Ni/SiO_2/Al_2O_3/ZrO_2$ (EP 0672 452)	1.5 mm extrudates	12.7	< 0.05	0.51	11
3	$Co/MnO_2/P_2O_5$ (EP 0 742 045)	4 mm extrudates	21.3	< 0.05	0.18	68
4	Ru/TiO_2	1.5 mm extrudates	14.8	< 0.05	0.006	99

[1] GC analysis (detection without water)
[2] Determination by means of ion chromatography [3] DMB = 2,2-dimethylbutanal

As those data clearly show, the Ru/TiO_2 catalyst (4) performed significantly better than the copper, cobalt and nickel based catalyst as particularly exemplified in the DE '525 application. The Office discounts the importance of those data because she believes that the results are not unexpected. Further, as Koch achieved a higher formate conversion by using a copper catalyst supported on TiO_2 compared to using a copper catalyst supported on Al_2O_3 (see page 4, second paragraph of the Action citing to the table with experimental results in DE '525).

There are three problems with the Office's position. First, a careful analysis of Koch's experimental conditions shows that there is not all that much significance in the differences between TiO_2 compared to Al_2O_3 when the other variables are taken into consideration. Second, Applicants disagree that one would have chosen Ru/TiO_2 from what Koch teaches with a reasonable expectation of success from a finite number of identified solutions as the properties of a catalyst are dependent on so many factors. Third, the formate conversion of 99% with the Ru/TiO_2 catalyst was not reasonably predictable from what is described in the cited art.

To the first point.

The better results achieved by the Cu/TiO_2-catalyst compared to the Cu/Al_2O_3-catalyst cannot be attributed to the difference of the support material alone. It is evident that reaction conditions of the experiments listed in DE '525 are different also in respect to the size of the catalyst pellets and in respect to the amount of catalyst used. The amount of Cu/TiO_2 used in the reaction (20 g) was more than twice as high as the amount of Cu/Al_2O_3 used in the reaction (9.5 g). As the conversion in a given time (speed of the reaction) is proportional to the catalyst concentration, a person skilled in the art would also attribute a large portion of the difference in formate conversion to the higher catalyst concentration used in the case of Cu/TiO_2. Furthermore, it is generally known that conversion depends also on

the available surface area of the catalyst. As the TiO_2- pellets used in the reaction (with a size of 3 x 3 mm) were smaller than the Al_2O_3-pellets (5 x 5 mm), they should also provide a higher available surface area per mass of catalyst. Therefore, a significant part of the increase of the performance in the experiment described by Koch where the Cu/TiO_2-catalyst was used can also be attributed to the difference in the size of the pellets.

Taking into account all these factors which can influence the formate conversion (catalyst material, catalyst size and amount of catalyst) and in view of the only marginal better properties achieved when using Cu/TiO_2 compared to Cu/Al_2O_3, a person skilled in the art would not consider TiO_2 to be a better support material than Al_2O_3. In view of the differences in the experimental conditions, one would consider Al_2O_3 and TiO_2 to be equivalent in performance.

Therefore, DE '525 provides no motivation whatsoever to select TiO_2 as a preferred support.

To the second point.

Following this argumentation, the Office has also not sufficiently established that it would have been "Obvious to Try" to specifically make two choices in the catalyst and the support, Ru/TiO_2, with a reasonable expectation of success. As already discussed above, the properties of a catalyst are dependent on so many factors, such as active material, support material, size, surface area, method of preparation (just to name a few), that catalyst performance is essentially not predictable. Since none of the components alone, neither Ru nor TiO_2, were found to show superior characteristics, one would have no incentive to choose this particular combination in view of the cited publications.

To the third point.

Following on the second point, the combination of Ru and TiO_2 leads to a dramatic increase in formate-conversion and shows a performance which is improved almost by a

factor 2 compared to the catalysts systems known from prior art. For an industrial-scale process, an improvement of the performance by a factor 2 is a landmark development.

As the properties of a catalyst are difficult to understand and predict from its structure, one would NOT have recognized the extraordinary results (presented in the specification) as being predictable. Said another way, the showing in the specification was unexpected.

In view of the above, reconsideration and withdrawal of the rejection is requested. A Notice of Allowance for all pending claims is requested.

Respectfully submitted,

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